



HERE'S THE DIRT!

SCIENCE EDUCATION AT THE NATIVE PLANT NURSERY

Golden Gate National Recreation Area

Here's the Dirt! Science Education at the Native Plant Nursery is part of Parks As Resources for Knowledge in Science (P.A.R.K.S.), a nationwide program designed to promote national parks as hands-on learning laboratories. P.A.R.K.S. is made possible by a generous grant from the Exxon Corporation, through the National Park Foundation, in partnership with the National Science Teachers Association.

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The Golden Gate National Parks Association (GGNPA) is a nonprofit membership organization dedicated to the preservation and public enjoyment of the Golden Gate national parks. The GGNPA manages five native plant nurseries throughout the Golden Gate National Recreation Area, and one at Oceana High School in Pacifica. The GGNPA staff is committed to project-based, quality education for K-12 students.



Overview

Here's the Dirt! Science Education at the Native Plant Nursery is a hands-on science program that introduces middle school students to plant ecology. This Educator's Handbook has been prepared for the classroom teachers and National Park Service (NPS) and the Golden Gate National Parks Association (GGNPA) staff who, together, make up the *Here's the Dirt!* education team.

CURRICULUM ORGANIZATION

The program is divided into classroom-based introductory lessons, a field program at one of Golden Gate National Recreation Area's native plant nurseries, and culminating projects that allow students to illustrate what they learned during the program. The lesson plans include a summary, expected duration, materials list, and facilitation procedure. Handouts and other relevant information that teachers may use at their discretion accompany the lessons.

Icon Key

Icons are used to designate whether lessons are classroom-based, field-based or web-based.

Location Icons:



Classroom



Park



Web-based

Glossary

At the end of the handbook is a Glossary of terms for words that may be new to students or teachers.

AUTHENTIC ASSESSMENT

Students will keep a notebook documenting their thoughts and questions during the program. Students will record their work, field observations, and the study questions they formulate. These notebooks can be used to assess the students' understanding of important concepts and the evolution of their knowledge and attitudes.

This Educator's Handbook includes performance standards, integrated assessment activities, and an achievement rubric to further facilitate evaluation. The rubric gives teachers and students a clear idea of the learning objectives.

EDUCATIONAL STANDARDS

Here's the Dirt! focuses on science principles learned through authentic restoration activities in a national park. The activities are designed to challenge students to use critical thinking and observational skills to draw conclusions about diversity, seed dispersal, ecosystems, plant adaptation, and other issues related to restoration work. Each activity, in the classroom or the park, is based on helping students meet National Science Education Standards.

PROGRAM LOGISTICS

So that all students may participate in and enjoy their program days at Golden Gate National Recreation Area, please take careful note of the following:

- **We must have one completed “Agreement for Sponsored Voluntary Services” form for each class** that participates in the program. We must also have a signed **“Parental Approval” form for each student**. We have provided master copies of these forms. Please note that park policy requires each individual/group in the program to complete these forms. **Those who do not complete the required forms will not be allowed to participate.**
- Clothing appropriate to the nature of the activities and weather conditions at the park is required. The following is a list of program-day considerations that need to be conveyed to students so they are prepared and can have a positive learning experience.

Dress in layers to accommodate the variable temperatures characteristic of the park (clothing and footwear may get dirty).

On sunny days, a cap and sunscreen are needed.

If there is a chance of rain, bring personal rain gear if possible.

- Arrangements can be made to accommodate most students with special needs. Please call the National Park Service staff to discuss any specific circumstances.

Here's the Dirt!

SUMMARY OF INSTRUCTIONAL ACTIVITIES



Classroom Preparation

Planting Words and Ideas - page 1

- › Students read *Habitat Restoration and Diversity*.
- › Students use a word search puzzle and Glossary to study vocabulary.
- › Students work together to formulate questions about habitat restoration, the National Park Service, or other elements of the program.

Return of the Wild! - page 10

- › Students play *Return of the Wild!* board game and learn about the benefits of diversity.

The Private Life of Plants - page 15

- › Students watch *The Private Life of Plants* video and complete an exercise about seed dispersal.

Mystery Plants - page 22

- › Students are introduced to the use of a dichotomous key by identifying mystery plants on the National Park Labs web site.

Indigenous Landscape - page 26

- › Students learn about the habitats, characteristics and indigenous uses of plants grown in the park nurseries.

Common Grounds - page 27

- › Students compare and contrast values held by groups that have interacted with and altered lands within the park.

National Park Field Session

Here's the Dirt! - page 1

- › Students work with nursery staff on plant propagation and other nursery operations. They gain an understanding of how plant propagation fits into the habitat restoration cycle. All activities are linked to National Science Education Standards. Stations may include:

- Sowing seeds
- Cuttings
- Nursery maintenance (pot washing or consolidating)
- Microscope investigations
- Demonstration Garden
- Composting
- Transplanting
- Seed cleaning

Culminating Projects

Environmental Jeopardy - page 1

- Students engage in an interactive game to review concepts studied during the program.

Patchwork Plants - page 97

- Students create a quilt depicting how they feel about national parks.

Talkin’ ‘Bout My reGeneration - page 98

- Students create an exhibition explaining their learning process during the program. They communicate what they have learned about habitat restoration, and how this new knowledge has led to deeper inquiries.

Get Down and Dirty! - page 99

- Students volunteer with a city agency or community-based organization to help restore a habitat or participate in a beautification project at an area near their school. The class also may assist in a project on their school grounds.

Spread it On - page 100

- Students learn about plant uses by creating an herbal salve using indigenous or exotic plants.

Plant One on Me! - page 102

- Students observe plant growth by propagating indigenous or exotic plants in their classroom.

Glossary

Appendices